

Brookhaven National Laboratory/National Synchrotron Light Source				
Subject:	LINAC LOTO			
Number:	LS-ESH-0012	Revision:	C	Effective: 2/11/2008
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[Revision Log](#)

Purpose: The LINAC Gun and the Low-Level RF S-Band Amplifier need to be safeguarded when performing radiological interlock tests for the VUV ring, X-Ray ring or the LINAC/Booster.

Scope: This procedure is applicable for radiation protection purposes for VUV & X-Ray ring, and LINAC/Booster interlock testing. Utilizing this procedure will permit the LINAC modulators to remain ON and allow LINAC/Booster area to remain secured. At no time shall anyone be permitted to enter the LINAC/Booster enclosure using this method of LOTO with the Modulators/Klystrons and Magnet Power Supplies On. Locking out the LINAC lockout switch will not permit these functions for testing - refer to procedure ["Radiation Safety LOTO", LS-ESH-0011](#) for further details. Only trained personnel are authorized to carryout this procedure.

Procedure:

1. Obtain 2 padlocks, 1 electrical plug LOTO device, 1 lock-tree or 1 Plug Safe (depending on the amplifier installed), 2 Hold tags, and 2 cable-ties.
2. Inform the control room operator that the LINAC Gun and Low-level RF S-Band Amplifier will be Locked/Tagged.
3. Turn OFF the Low-Level RF amplifier by either flipping the ON/OFF switch to the OFF position or disconnecting the power plug – method depends on the amplifier installed.
4. Place a lock & tag on the Low-level RF amplifier as follows:
 - Unit has removable power cord: Unplug the power cord and remove the cord from the unit. Install an Electric Plug LOTO device directly on unit plug.
 - Unit has hardwired power cord: Unplug the power cord. Place the power cord plug in a Plug Safe. Place Lock/Tag on Plug Safe.
5. LINAC Gun: Identify the disconnect switch for the LINAC gun located directly on the gun cabinet. Don the appropriate PPE in accordance with BNL SBMS and on the disconnect switch warning label.
6. Verify the Gun HV power supply is ON by reading the voltage meter.
7. Throw the disconnect switch to the OFF position while observing the meter voltage on the Gun HV power supply goes to Zero volts.
8. Lock/Tag the Gun disconnect switch.
9. Inform that the machine operator that the LINAC Gun and low-level RF amplifier is Locked/tagged.
10. Log all LOTO applications.
11. Upon successful completion of interlock testing, the Low Level RF and LINAC Gun may return to service.
12. Gun Return to Service: Remove lock and tag. Don appropriate PPE. Throw LINAC Gun disconnect switch to the ON position.
13. Low Level RF Return to Service: Remove lock and tag. Remove LOTO device. Plug in power cord and turn on unit switch.
14. Inform the machine operator that LOTO has been removed.

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**Document Review
Frequency**

1 Years

Review signatures on file
with master copy of
controlled document

NSLS REVISION LOG		
Document Number:		LS-ESH-0012
Subject:		LINAC LOTO
Rev	Description	Date
A	Initial Document	3/26/2002
B	<ul style="list-style-type: none"> Step 1, 6 & 7 was revised to address the different types of amplifiers to LOTO. Several sentences were reworded for clarification (e.g. job titles, adding reference procedure name). Sentence added to address that no one enter the LINAC/Booster enclosure when supplies are on during testing. The review frequency was changed to 1-year to be consistent with BNL LOTO policy. 	3/9/2005
C	<ul style="list-style-type: none"> LEBT valve no longer LOTOed because it is now a critical device and part of the interlock tests. Persons performing procedure need to be trained. Step by step procedures added for LOTO of LINAC gun. Revised steps for LOTO of low level RF. Included steps for return to service. 	2/11/2008

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